

What is claimed is:

1 1. A method of imaging an artery of a patient using
2 magnetic resonance imaging, comprising,
3 detecting an elevated concentration of magnetic resonance
4 contrast agent in the artery; and
5 imaging at least a portion of the artery including
6 collecting image data which is representative of the center of
7 k-space after detecting the elevated concentration of magnetic
8 resonance contrast agent in the artery.

1 2. The method of claim 1 wherein the step of imaging at
2 least a portion of the artery further includes collecting image
3 data which is representative of the center of k-space when a
4 concentration of the contrast agent in the artery is
5 substantially higher than a concentration of the contrast agent
6 in veins adjacent to the artery.

1 3. The method of claim 1 wherein the step of imaging at
2 least a portion of the artery includes collecting image data
3 which is representative of the center of k-space when the
4 concentration of the contrast agent in the artery is greater
5 than a predetermined concentration.

1 4. The method of claim 1 wherein the step of imaging at
2 least a portion of the artery includes collecting image data
3 which is representative of the center of k-space substantially
4 at the beginning of an imaging sequence.

1 5. The method of claim 4 wherein the imaging sequence is
2 a 3D imaging sequence.

1 6. The method of claim 1 wherein the step of detecting an
2 elevated concentration of magnetic resonance contrast agent in
3 the artery further includes measuring a base line signal which
4 is representative of a response of the artery to at least one
5 magnetic resonance radio frequency pulse prior to administering
6 the magnetic resonance contrast agent to the patient.

1 7. The method of claim 6 wherein the step of detecting an
2 elevated concentration of magnetic resonance contrast agent in
3 the artery includes the step of monitoring the artery after
4 administering the contrast agent to the patient to detect the
5 arrival of the contrast agent in the artery.

1 8. The method of claim 7 wherein the step of detecting an
2 elevated concentration of contrast in the artery further
3 includes the step of detecting a change in the response of the
4 artery to at least one magnetic resonance radio frequency pulse.

1 9. The method of claim 8 wherein the change in the
2 response of the artery to at least one radio frequency pulse
3 includes a change in a maximum amplitude of a responsive RF
4 signal or a change in the shape of a responsive RF signal.

1 10. The method of claim 7 wherein the step of imaging at
2 least a portion of the artery of interest includes collecting
3 image data which is representative of the center of k-space
4 substantially at the beginning of an imaging sequence and while
5 the concentration of the contrast agent in the artery is
6 substantially elevated.

1 11. The method of claim 10 wherein the imaging sequence is
2 a gradient echo imaging sequence.

1 12. The method of claim 10 wherein the imaging sequence is
2 a 3D gradient echo imaging sequence.

1 13. A method of imaging an artery in a region of interest
2 of a patient using magnetic resonance imaging, comprising,
3 detecting a predetermined concentration of magnetic
4 resonance contrast agent in the artery; and
5 imaging at least a portion of the artery including
6 collecting image data which is representative of the center of
7 k-space after detecting the predetermined concentration of the
8 contrast agent in the artery and while the concentration in the
9 artery is higher than a concentration of the contrast agent in
10 veins adjacent to the artery.

1 14. The method of claim 13 wherein the step of detecting
2 a predetermined concentration of magnetic resonance contrast
3 agent in the artery detects the arrival of the contrast in the
4 artery.

1 15. The method of claim 14 wherein the step of imaging at
2 least a portion of the artery of interest includes collecting
3 image data which is representative of the center of k-space
4 substantially at the beginning of a 3D imaging sequence.

1 16. The method of claim 13 wherein the step of imaging at
2 least a portion of the artery further includes collecting image
3 data which is representative of the center of k-space while the
4 concentration in the artery is substantially higher than a
5 concentration of the contrast agent in veins adjacent to the
6 artery.

1 17. The method of claim 16 wherein the step of detecting
2 magnetic resonance contrast agent in the artery includes
3 detecting a substantially elevated concentration of magnetic
4 resonance contrast agent in the artery and the step of imaging
5 at least a portion of the artery includes collecting image data
6 which is representative of the center of k-space after detecting
7 the substantially elevated concentration of magnetic resonance
8 contrast agent in the artery.

1 18. The method of claim 17 further including the step of
2 administering the magnetic resonance contrast agent to the
3 patient in a bolus type injection and wherein the step of
4 imaging at least a portion of the artery of interest includes
5 collecting image data which is representative of the center of
6 k-space substantially at the beginning of a 3D imaging sequence.

1 19. An apparatus for imaging an artery in a region of
2 interest of a patient using magnetic resonance imaging,
3 comprising,
4 detecting means for detecting a predetermined concentration
5 of magnetic resonance contrast agent in the artery and, in
6 response thereto, for generating an imaging initiation signal;
7 and
8 imaging means, coupled to the detecting means, for
9 collecting image data which is representative of the center of
10 k-space in response to the imaging initiation signal.

1 20. The apparatus of claim 19 wherein the imaging means
2 collects the image data which is representative of the center of
3 k-space substantially at the beginning of a 3D imaging sequence.

1 21. The apparatus of claim 19 wherein the detecting means
2 generates the imaging initiation signal when the concentration
3 of the contrast agent in the artery is substantially elevated.

1 22. An apparatus for imaging an artery of a patient using
2 magnetic resonance imaging and a magnetic resonance imaging
3 contrast agent, comprising,

4 detecting means for generating an imaging initiation signal
5 in response to detecting the magnetic resonance imaging contrast
6 agent in the artery; and

7 imaging means, coupled to the detecting means, for
8 collecting image data which is representative of the center of
9 k-space in response to the imaging initiation signal.

1 23. The apparatus of claim 22 wherein the imaging means
2 collects the image data which is representative of the center of
3 k-space substantially at the beginning of a 3D imaging sequence.

1 24. The apparatus of claim 22 wherein the imaging means
2 collects image data which is representative of a periphery of k-
3 space after collecting image data which is representative of the
4 center of k-space.